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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,412	06/24/2003	Sean S. Kang	LAM1P176/P1149	3439

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EXAMINER

AHMED. SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/603,412

Applicant(s)

KANG ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 7-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/24 & 11/17/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-15, drawn to a process, classified in class 216, subclass 18.
 - II. Claim 16, drawn to a product by process, classified in class 257, subclass 758.
 - III. Claims 17-19, drawn to an apparatus, classified in class 156, subclass 345.24.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by different process such as one, wherein via plug deposition and trench etching are performed in two separate chambers.
3. Inventions II and III are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this

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case the product can be made by another different apparatus such as one with end-point detection other than the computer-coded signals.

4. Inventions I and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process can be practice another different apparatus such as one with end-point detection other than the computer-coded signals.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

6. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 1 recites the limitation "the plasma processing chamber" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-6 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al (US 2004/0192058) in view of Lee et al (US 2003/0151020).

Chu et al disclose a process for making a damascene structure, wherein etching vias (28) in dielectric material layer (25) with in a plasma processing chamber (paragraph 0021-0022).

Chu et al also disclose forming a patterned photoresist (32b) with a trench pattern (paragraph 0023).

Chu et al also teach that filling the via with a polymeric material to form via plug and subsequently performing trench etching utilizing a plasma (see paragraph 0027).

Chu et al teach that after forming the damascene structure, oxygen ashing is performed to remove the photoresist and via plug to complete the damascene structure (paragraph 0031, see also figure 3).

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Chu et al teach that filling the via using spin-coating process but fail to teach the filling is performed by plasma processing.

However, Lee et al teach that filling via/trench by means of known technology in the art including methods of spin coating, jet coating, chemical vapor deposition (CVD) etc. (paragraph0020).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of claimed invention to combine Lee et al's teaching into Chu et al's process because both the spin-coating and CVD utilizing plasma processing are functionally equivalent as taught by Lee et al.

It is noted that the apparatus limitation of "within a single plasma processing chamber providing a combination via plug deposition----- and trench etch" is not given patentable weight because it does not further limit the process steps as cited in claim 1.

It has been held that Apparatus limitations, unless they affect the process in a manipulative sense, may have little weight in process claims. *In re Tarczy-Hornoch* 158 USPQ 141, 150 (CCPA 1968); *In re Edwards* 128 USPQ 387 (CCPA 1961); *Stalego v. Heymes* 120 USPQ 473, 478 (CCPA 1959); *Ex parte Hart* 117 USPQ 193 (PO BdPatApp 1957); *In re Freeman* 44 USPQ 116 (CCPA 1940); *In re Sweeney* 72 USPQ 501 CCPA 1947).

Allowable Subject Matter

11. Claims 7-9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach a process including the step of simultaneously forming the via plug and etching the trench as the context of claim 7.

The prior art also does not teach a process including the step of forming the via plug and etching the trench in the combination step by providing a cyclic process with a via plug forming phase and the trench etching phase as the context of claim 8.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ma et al (6,764,810), Hsu et al (6,569,777) and Pramanik et al (5,493,146) and Huang (US 2004/0087167) disclose conventional process for forming damascene structures.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shamim Ahmed
Examiner
Art Unit 1765

SA
January 12, 2005